02-26-2022

SERVIR Weather and Climate Services: *Data in Action*

J. Brent Roberts, NASA MSFC
Amanda Markert, University of Alabama in Huntsville

Countries Around the World Need Weather and Climate Data

SERVIR

PROBLEM

- Complex challenges occur in data-scarce environments
- Many countries lack the capacity to use satellite data and geospatial technologies to manage resources and risk

APPROACH

- Build regional capacity at a global scale in the spirit of self-reliance
- Ensure needs-driven and collaborative solutions for impact, buy-in, and sustainability
- Leverage U.S. leadership in science and technology

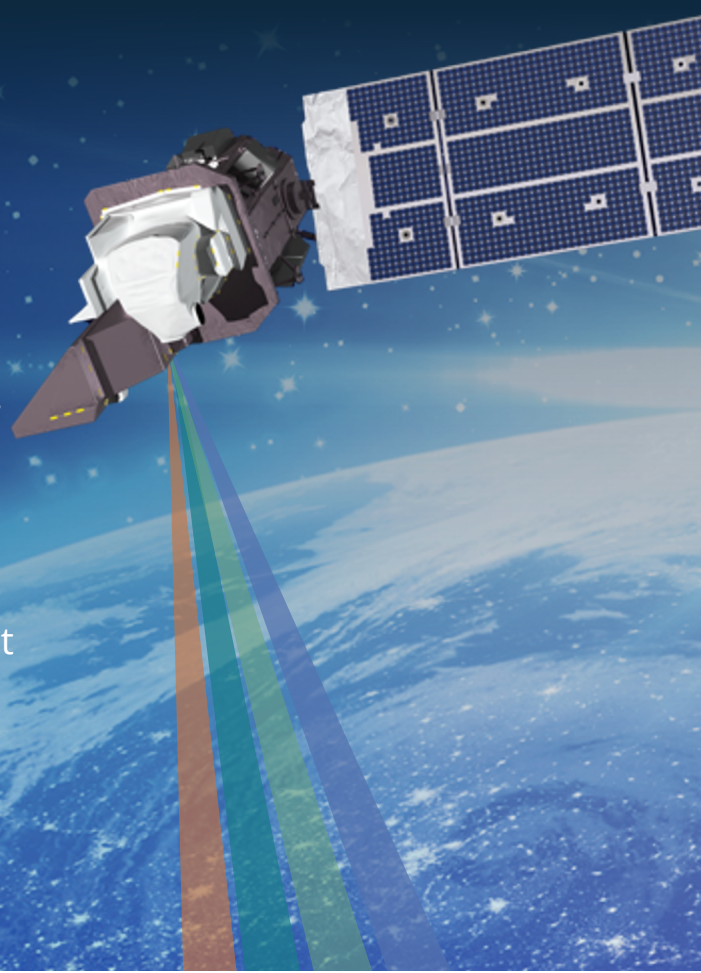
Agriculture & Food Security

Water & Water-Related Disasters

Land Cover, Land Use Change & Ecosystems

Weather & Climate

CONNECTING
SPACE TO **VILLAGE**



SERVIR is a partnership of NASA, USAID, and leading geospatial organizations in Asia, Africa, and Latin America.

- We work with countries and organizations in the use of free and open satellite data to build resilience to climate change and address its contributing causes.
- We co-develop innovative solutions through a network of regional hubs to improve sustainable resource management at local, national and regional scales.
- We build capacity to address critical challenges in climate change, food security, water and related disasters, land use, and air quality.

USAID FROM THE AMERICAN PEOPLE | NASA | SERVIR | RCMRD | ICIMOD | adpc | ALLIANCE Bioversity CIAT

SERVIR Focuses on Countries in Asia, Africa, & the Americas

Who Is SERVIR?

SERVIR

USAID
FROM THE AMERICAN PEOPLE

- Poverty reduction & resilience
- Data-dependent issues in data-scarce places
- International field presence

NASA

- 30+ Earth observing satellite missions, free & open data
- Major research portfolio
- Societal benefit from space

Private sector collaborators:

Google · mapbox · development SEED · planet. · esri · aws · MAXAR TECHNOLOGIES

USG collaborators:

NOAA · USGS science for a changing world · USAID · U.S. Department of State

Intergovernmental, NGO collaborators:

Food and Agriculture Organization of the United Nations · WFP World Food Programme · MERCY CORPS

Research collaborators: 20+ US universities & research centers through the SERVIR Applied Sciences Team; ITC, in-region university networks

Regional Hub Host Institutions:

ALLIANCE Bioversity International · CIAT · CILSS · RCMRD · ICIMOD · adpc

Hub Consortium Members:

Deltares Enabling Delta Life · SEI Stockholm Environment Institute · Spatial Informatics Group · Conservación Amazónica ACCA · imaflora · eco ciencia · ICRISAT International Crops Research Institute for the Semi-Arid Tropics · AFRIGIST · CERSGIS · ACMAD · CSE 30 ans Centre de Suivi Ecologique

Gender Integration & Action

SERVIR works to make geospatial technologies and professions more **gender responsive** and **inclusive** by:

1. **Supporting women leaders & gender champions** in SERVIR, creating an equal opportunity work environment

2. **Empowering women and girls to explore STEM fields** in countries and regions where we operate

3. **Integrating gender considerations in service planning** through gender analyses and participatory review

4. Using remote sensing and GIS to address issues **disproportionately impacting groups** characterized by gender, ethnicity, age, and/or social status

What Makes SERVIR Unique?

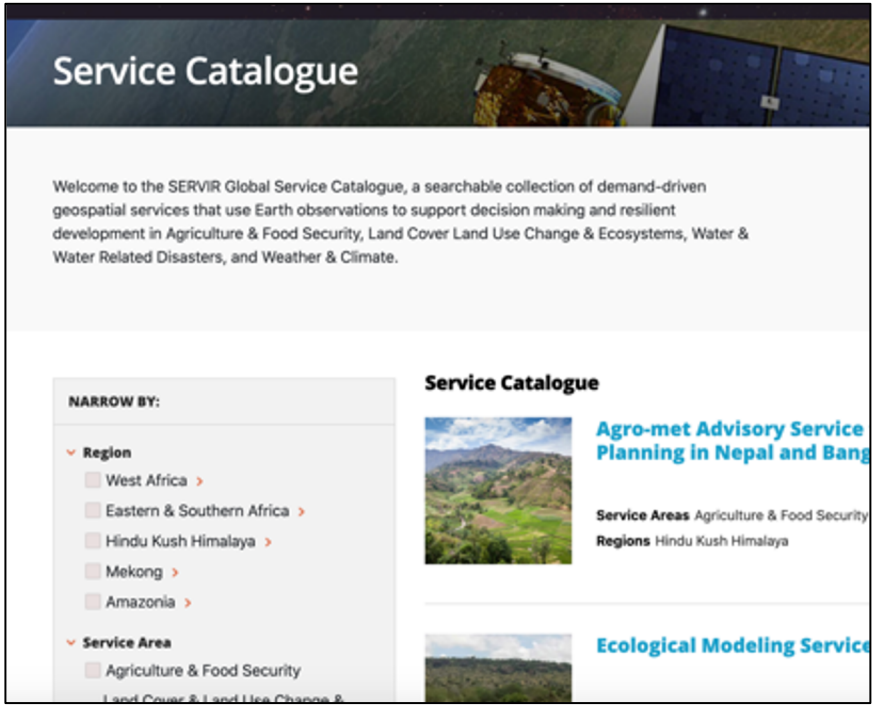
SERVIR services are…

- **Demand-driven** to ensure each community's needs and values are prioritized throughout the process
- **Co-developed** with regional experts to bring together NASA science and in-depth local knowledge
- **Inclusive**, emphasizing that services must be accessible and represent the needs of women and indigenous communities
- **Built to last**, prioritizing trainings and resources to strengthen capacity and foster sustained capabilities

SERVIR Service Planning Toolkit & SERVIR Catalogue

SERVIR Planning Tools:

- Consultation & Needs Assessment
- Stakeholder Mapping
- Service Design
- Monitoring, Evaluation & Learning



[Service Planning Toolkit Link]

[Service Catalogue Link]

SERVIR Service Examples: Data in Action

Regional Hydrologic Extremes Assessment System (RHEAS)

South Asia Land Data Assimilation System (SALDAS)

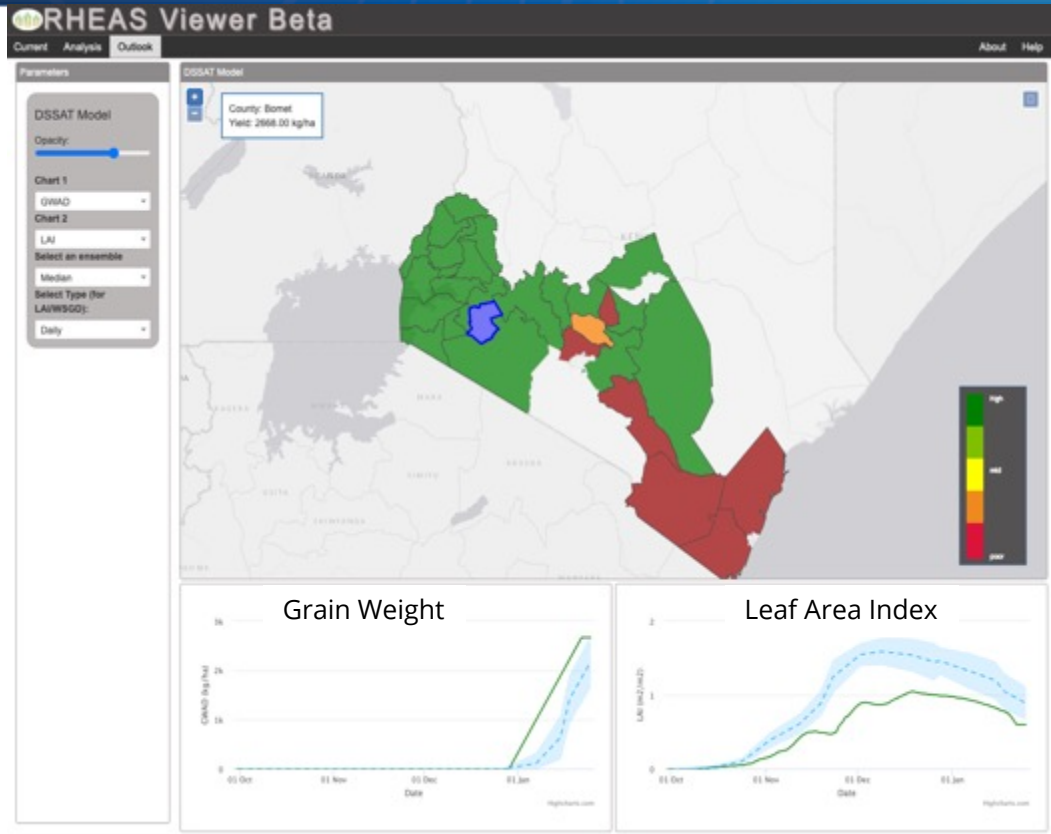
Ephemeral Water Body Mapping

High-Impact Weather Assessment Tool (HIWAT)

Cross-Cutting: Data Access with ClimateSERV

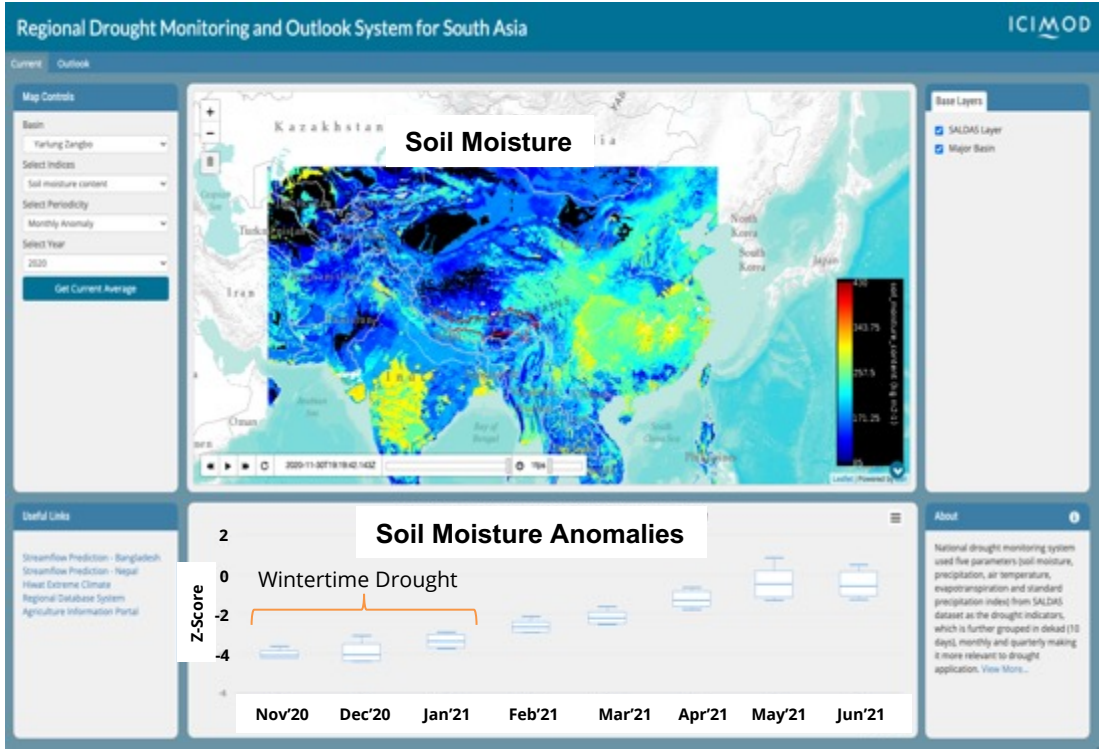
The Regional Hydrologic Extremes and Assessment System (RHEAS)

- Framework for providing nowcast and forecasts of hydrologic and agricultural forecasts - e.g., streamflow and crop yields
- Deployed this system in multiple regions including Eastern Africa and Southeast Asia
- Advanced planning often requires the use of application models such as DSSAT or hydrologic models forced by hydrometeorological information



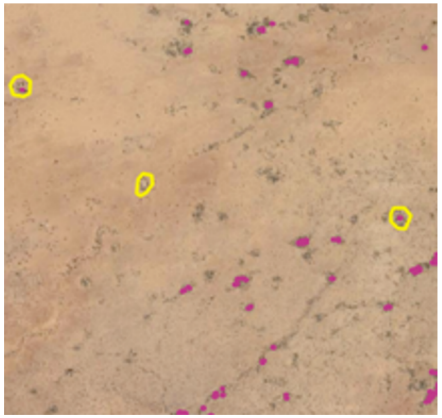
South Asia Land Data Assimilation System (SALDAS)

- An integrated land data assimilation system providing real-time monitoring and outlooks based on seasonal forecasting
- Tailored system for South and Southeast Asia and currently deployed by ICIMOD
- SALDAS is powered by forecasts from the NASA Goddard Earth Observing System S2S prediction system (GEOS-S2S)



Courtesy of ICIMOD: http://tethys.icimod.org/apps/regionaldrought/

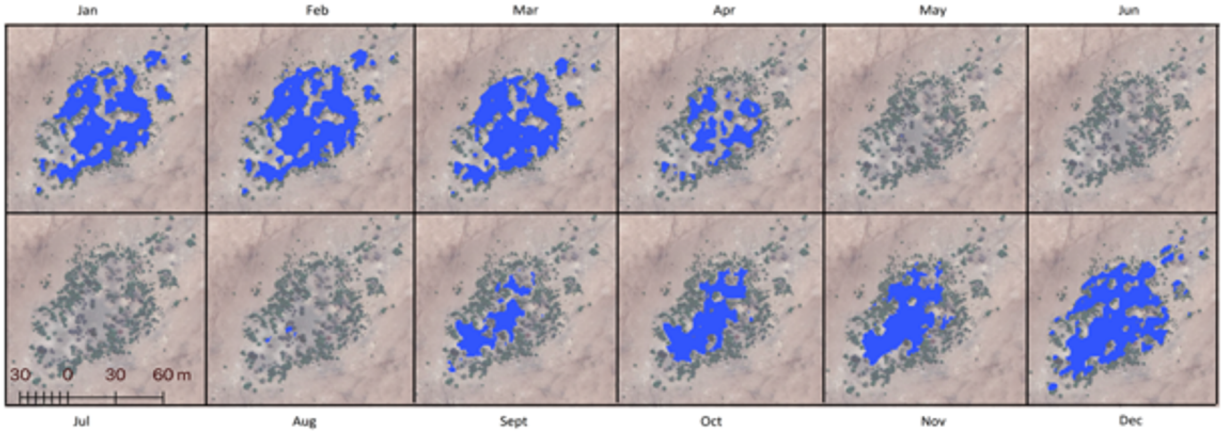
Ephemeral Water Body Monitoring in West Africa



Ephemeral water bodies detected using high resolution Planet data time series. Known ephemeral ponds are outlined in yellow.

Pastoralists in parched West African rangelands rely on small ponds for their livestock. SERVIR has developed a tool to monitor and map where water is available.

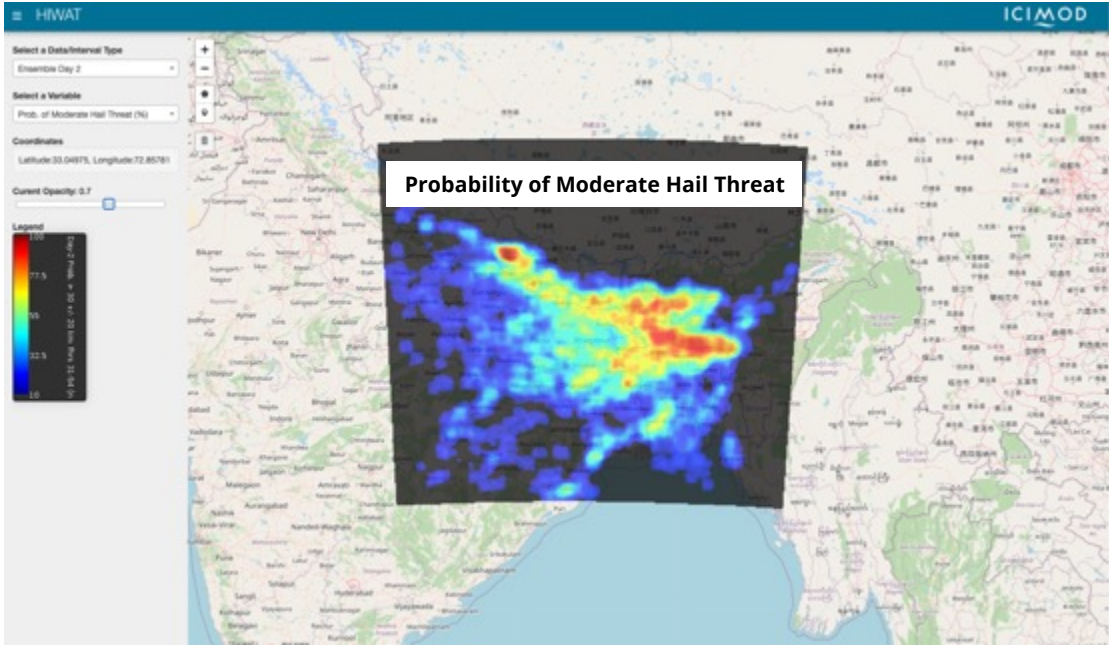
- These small water bodies hold water for part of the year, providing for the region's nearly 60,000 herders
- Monthly composites provide actionable information to direct herds during the dry season (Oct-June)
- Information is relayed by a web-based platform and community radio broadcasts in remote areas



Improving Storm Forecasting Across South Asia

The **High Impact Weather Assessment Tool** (HIWAT) is used by officials in Bangladesh and Nepal for high-accuracy forecasts and warnings ahead of floods, hail, lightning, and other hazards across south Asia.

- A limited-area, high-resolution triggered ensemble prediction system for severe weather threat
- This system has been developed for South Asia and its outputs have been further coupled to hydrologic model for flood applications

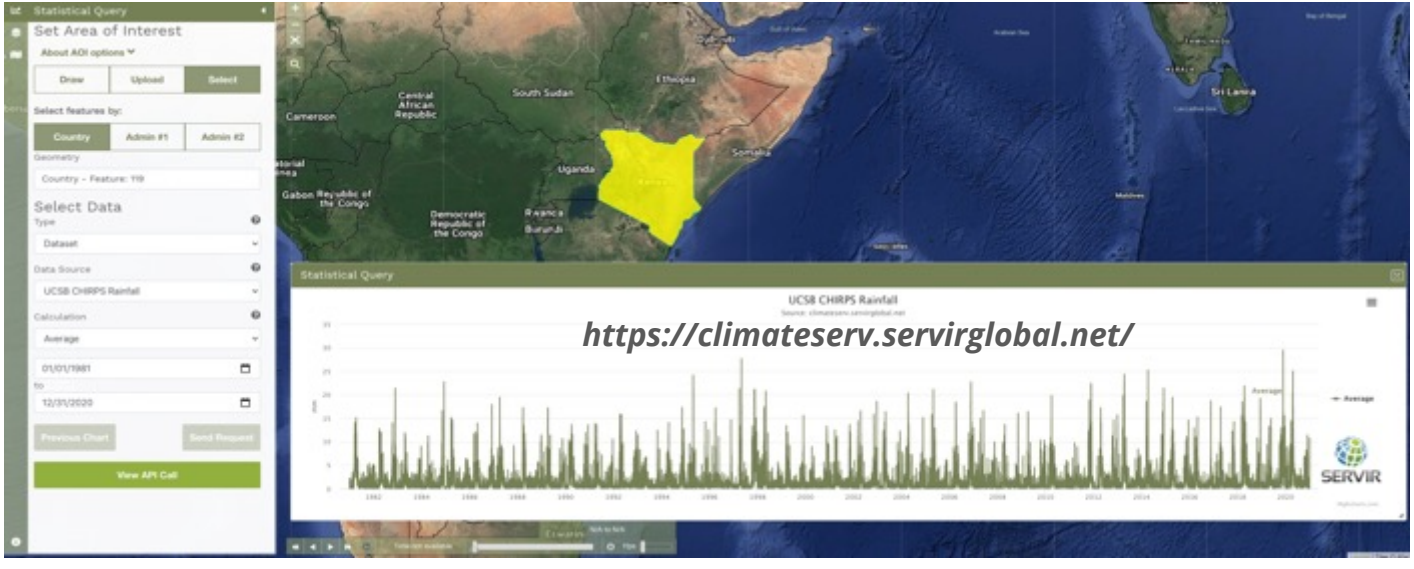


Courtesy of ICIMOD: http://tethys.icimod.org/apps/hiwat/

ClimateSERV Increases Global Access to Critical Hydroclimatic Data

ClimateSERV provides web-accessible, actionable climate information for regional and local decisionmakers:

- Demand-driven datasets
- Flexible: Download, Visualization, Server-side statistics
- Adaptable: User-specified temporal and spatial querying
- Robust: Low-bandwidth access to data, both GUI and API access



Example: 40-year query of CHIRPS rainfall for Kenya area-average with less than 30 second return

Summary

- A joint initiative of NASA, USAID, and leading geospatial organizations in Asia, Africa, and Latin America, SERVIR partners with countries and organizations in these regions to address critical challenges in climate change, food security, water and related disasters, land use, and air quality.

Key Points:

- Demand-Driven: Follow service planning approach
- Co-Development: Focus on working with end-users and developing tools and building capacity to use those tools
- Interdisciplinary: Multiple thematic areas address agriculture and food security, water resources, land cover and land use change, and weather and climate risks